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EXAMINER

BOES, TERENCE

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 7, 9, and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Ovshinsky US 2,967,980.

Ovshinsky discloses:

- a first shaft (304); a spur gear (314) mounted to the first shaft;
- a second system including: a second shaft (302, 300),
- the first and second shafts having an angular variance greater than zero degrees (this can clearly be seen in figure 10);
- a face gear (306, 310, 312) including a hub (306) mounted to the second shaft (300, 302)
- an angled gear flange (310) surrounding the hub (306), and a plurality of gear teeth (see 312 in figures 10 and 11) on the gear flange,
- the low angle face gear in mesh with the spur gear 312 is shown meshing with 314 in figure 10)
- wherein a first vector normal to an outside surface of the angular flange (see line which is normal to dash-dot line through gear teeth 312) and a second vector normal to the second shaft (axis of 300, 302) form an angle

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that is equal to the angular variance of the first and second shafts (this can easily be deduced upon viewing figure 10)

- wherein the teeth of the face gear are formed by a precision grinding method (product by process claims are not limited to the manipulations of the recited steps, only the structure implied by the steps. See MPEP 2113).

Regarding claim 15,

- first and second shafts that are non-parallel (304, 300, 302);
- a spur gear on the first shaft (314);
- a face gear (306, 310, 312) on the second shaft,
- the face and spur gears in constant mesh (this can be seen in figure 4),
- the face gear including a hub (306) on the second shaft,
- an angled flange (310) around the hub,
- gear teeth (312) on the angled flange,
- the flange angled so the face gear achieves line contact with the spur gear when the gears are in mesh (this can be seen in figure 10).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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2. Claims 7-10, and 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yokel USP 3,803,934 in view of Ovshinsky US 2,967,980 (as discussed above).

Yokel discloses:

- a first shaft (10); a gear (18) mounted to the first shaft;
- a second system including: a second shaft (40),
- the first and second shafts having an angular variance greater than zero degrees (C3/L15-20);
- a face gear (44) including a hub mounted to the second shaft (40)
- an angled gear flange (see @ 44 in figure 1) surrounding the hub, and a plurality of gear teeth (these can clearly be seen in figure 1) on the gear flange,
- the low angle face gear in mesh with the gear (44 is shown meshing with 18 in figure 1)
- wherein the second system includes an engine (C2/L14-15) for driving the first shaft and a transmission (see transmission in abstract) driven by the second shaft
- wherein the teeth of the face gear are formed by a precision grinding method (product by process claims are not limited to the manipulations of the recited steps, only the structure implied by the steps. See MPEP 2113).

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- wherein the first and second shafts have an angular variance of no more than 30 degrees (C3/L15-20).

Regarding claim 15,

- first and second shafts that are non-parallel (10 and 40);
- a first gear on the first shaft (18);
- a face gear (44) on the second shaft,
- the face and first gears in constant mesh (this can be seen in figure 4),
- the face gear including a hub (see inside portion of gear 44) on the second shaft,
- an angled flange (see angle of flange of gear 44) around the hub,
- gear teeth (see gear teeth of gear 44) on the angled flange,

Yokel discloses meshing gears on angled shafts for transmitting motion. Yokel does not disclose a spur gear meshed with a low angle face gear. Ovshinsky teaches a spur gear (314) meshed with a low angle face gear (312) to transmit motion to an angled shaft. Because both Yokel and Ovshinsky teach meshing gears to transmit motion on angled shafts, it would have been obvious to one having ordinary skill in the art at the time of the invention to substitute gear pairs to achieve the predictable result of transmitting motion on angled shafts.

3. Claim 10, as best understood, is rejected under 35 U.S.C. 103(a) as being unpatentable over Yokel USP 3,803,934 in view of Ovshinsky US 2,967,980, as applied to claim 8 above, and further in view of Stone et al. US 3,942,387.

Yokel in view of Ovshinsky discloses a low angle face gear transmission. Yokel in view of Ovshinsky does not disclose a transmission used in a rotary aircraft. Stone et al. teaches an angle face gear transmission used within a rotary aircraft (see helicopter in title). Because both Yokel in view of Ovshinsky, and Stone et al. teach angle face gear transmissions, it would have been obvious to one having ordinary skill in the art at the time of the invention to use a low angle face gear transmission within a rotary aircraft to achieve the predictable result of transmitting power from an engine to a propeller.

### ***Conclusion***

4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to TERENCE BOES whose telephone number is (571)272-4898. The examiner can normally be reached on Monday - Friday 9:00 AM - 4:00 PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Ridley can be reached on (571) 272-6917. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Terence Boes/  
Examiner, Art Unit 3656

/Richard WL Ridley/  
Supervisory Patent Examiner, Art Unit 3656